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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/757,364	01/08/2001	Albert W. Chan	6136-53650	6620

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EXAMINER

HARAN, JOHN T

ART UNIT PAPER NUMBER

1733

DATE MAILED: 04/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/757,364

Applicant(s)

CHAN ET AL.

Examiner

John T. Haran

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-16 and 21-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14 and 15 is/are allowed.
- 6) ☐ Claim(s) 1,3-5,21-23,25 and 26 is/are rejected.
- 7) ☒ Claim(s) 6-13,16 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the amendment and arguments filed on 3/22/04. In light of the amendments to the claims and the arguments made all previous rejections are withdrawn.

Claim Objections

2. Claim 1 is objected to because of the following informalities: in the contacting step the phrase "an a solder joint" should read - - a solder joint - -. Appropriate correction is required.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1, 3-5, 21-23, and 25-26 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,518,096. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of the patent is directed to a method of forming an interconnect assembly wherein first and second semiconductor substrate are

provided with conducting surfaces; the first substrate has solder on the conducting surfaces; the second substrate has an unfilled liquid polymeric material dispensed on the conducting surface; the first substrate is placed on the second substrate; the substrates are pressed together such that the solder on the conductive surface of the first substrate contacts the conductive surface on the second substrate; the assembly is heated to form a metallurgical joint between the conductive surfaces via the solder such that the assembly is heated to above the melting point of the solder and is then lowered to the curing temperature of the polymeric liquid.

Claim 1 of the patent does not explicitly state that the liquid polymeric material being disposed inwardly from the edges of the first and second substrate and that the liquid polymeric material flows towards the edges during the pressing step, however it is clear that such is the intent of the patent in view of Figures 1 and 3. Claim 1 of the patent also does not explicitly state that the solder joint is formed before the polymer is hardened, however it is clear that is what occurs by heating to above the melting point of the solder and then lower to the curing temperature of the polymer (Column 9, lines 1-15). It would have been obvious to one of ordinary skill in the art at the time the invention was made that the liquid polymeric material is disposed inwardly from the edges of the first and second substrate, that the liquid polymeric material flows towards the edges during the pressing step, and that the solder joint is formed before the polymer is hardened in the claimed method as suggested by the patent.

Regarding claim 3, one skilled in the art would have readily appreciated that it is common for semiconductor substrates to have dies and it would have been obvious for the substrates to have dies and for the polymeric material to be dispensed on them.

Regarding claim 4, one skilled in the art would have readily appreciated that semiconductor substrates vary in size, that it is known for them to be 36 sq inches, and that the method would working for joining substrates of that size and it would have been obvious to do so.

Regarding claim 5, one skilled in the art would have readily appreciated that it is common for solder to be in the form of bumps and it would have been obvious to use a conventional shape for the solder.

Regarding claim 21, the patent teaches the curing occurs at a lower temperature than the melting of the solder (Column 9, lines 1-15).

Regarding claim 22, one skilled in the art would have readily appreciated that the melting temperature of the solder and the curing temperature of the polymeric material would depend upon the specific materials used. Additionally, the patent teaches the temperatures within the claimed ranges (Column 8, lines 51-52; Column 9, lines 1-4).

Regarding claim 23, one skilled in the art would have readily appreciated dispensing the polymeric material at multiple points in order to facilitate and expedite spreading of the polymeric material and it would have been obvious to do so.

Regarding claim 25, one skilled in the art would have readily appreciated it is common in the art to bond under vacuum in order to eliminate bubbles in the polymeric material and it would have been obvious to do so.

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Regarding claim 26, claim 1 specifies that the polymeric material is unfilled.

Allowable Subject Matter

5. Claims 14 and 15 are allowed.

The prior art fails to suggest a fluxing agent comprising a beta phenylacrylic acid and/or a beta phenylhydroxyacrylic acid. Absent any art showing a fluxing agent comprising either types of acid the subject matter of claims 14 and 15 are considered allowable.

6. Claims 1, 3-13, 16, and 21-26 would be allowable if a terminal disclaimer is filed to overcome the obviousness type double patenting rejection.

As noted, in Applicant's arguments filed on 3/22/04, the prior art of record, fails to suggest all the claimed features.

7. Claims 6-13, 16, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

U.S. Patent 6,518,096 is directed to a fluxless method for forming an interconnect assembly and there is no suggestion or motivation to use a polymeric material or solder with flux since it would be contrary to the purposes of the patent.

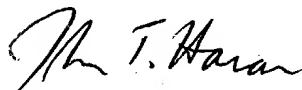
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Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John T. Haran** whose telephone number is **(571) 272-1217**. The examiner can normally be reached on M-Th (8 - 5) and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John T. Haran